World Academy of Science, Engineering and Technology
International Journal of Nuclear and Quantum Engineering
Vol:14, No:06, 2020

Radionuclide Contents and Exhalation Studies in Soil Samples from Sub-Mountainous Region of Jammu and Kashmir

Authors : Manpreet Kaur

Abstract : The effect of external and internal exposure in outdoor and indoor environment can be significantly gauged by natural radionuclides. Therefore, it is a consequential to approximate the level of radionuclide contents in soil samples of any area and the risks associated with it. Rate of radon emerging from soil is also one of the prominent parameters for the assessment of radon levels in environmental. In present study, natural radionuclide contents viz. ^{232}Th, ^{238}U and ^{40}K and radon/thoron exhalation rates were evaluated operating thallium doped sodium iodide gamma radiation detector and advanced Smart Rn Duo technique in the soil samples from 30 villages of Jammu district, Jammu and Kashmir, India. Radon flux rate was also measured by using surface chamber technique. Results obtained with two different methods were compared to investigate the cause of emanation factor in the soil profile. The radon mass exhalation rate in the soil samples has been found varying from 15 ± 0.4 to 38 ± 0.8 mBq kg^{-1} h^{-1} while thoron surface exhalation rate has been found varying from 90 ± 22 to 4880 ± 280 Bq m^{-2} h^{-1}. The mean value of radium equivalent activity (99 ± 27 Bq kg^{-1}) was appeared to be well within the admissible limit of 370 Bq kg^{-1} suggested by Organization for Economic Cooperation and Development (2009) report. The values of various parameters related to radiological hazards were also calculated and all parameters have been found to be well below the safe limits given by various organizations. The outcomes pointed out that region was protected from danger as per health risks effects associated with these radionuclide contents is concerned.

Keywords : absorbed dose rate, exhalation rate, human health, radionuclide
Conference Title : ICRDM 2020 : International Conference on Radiation Detection and Measurement
Conference Location : London, United Kingdom
Conference Dates : June 29-30, 2020